

CHAPTER 1
INTRODUCTION

1.1 Introduction

1.1.1 General

This manual presents approaches, methods, and procedures for the design of drainage structures on ADOT highway projects. Although many procedures are systematically presented, they are only a tool. The designer of the facility remains responsible for analyzing the situation and selecting the approach to solve the problem including the choice of the correct tool.

Computer programs take out the intensive effort for the performance of many computations. However, they are no replacement for the judgments necessary. The user of computer programs must understand how the program performs the calculations and what assumptions are made, i.e., how appropriate is the use of the computer program to the problem being addressed. In this manual several procedures are presented that are more efficiently performed by the use of computer programs. In some areas of the manual, examples are given that were done using a computer program. The principles necessary for solving the necessary formulas and equations are presented in the manual. The manual does NOT present directions on how to run the computer program, the designer must refer to the appropriate user manual of those programs.

1.1.2 Background

Much of this manual uses the AASHTO Model Drainage Manual as the lead information document with additional information from the Flood Control District of Maricopa County Hydraulics Manual and the Standards Manual for Drainage Design and Floodplain Management in Tucson, Arizona. The American Association of State Highway and Transportation Officials (AASHTO) Task Force on Hydrology and Hydraulics produced the Model Drainage Manual as part of their continuing work to assist the Standing Committee on Highways, Subcommittee on Design, in developing guidelines and in formulating policy. The Task Force which was established in 1970 has also produced a series of guides which are published as the AASHTO Highway Drainage Guidelines (HDG). The drainage guidelines provide an overview of the subject area and references to appropriate design procedures.

The manual has been developed to give the designer a basic working knowledge of hydraulics complete with example problems. All basic design elements are included such that the designer can design highway drainage with minimal assistance. However, this manual cannot provide guidance on complex hydrologic or hydraulic problems and is no substitute for experience or engineering judgment. References to specific computer programs, AASHTO guidelines, manuals and regulations will be noted within the manual. It is expected that the designer will be knowledgeable in the use of the referenced items.

1.1 Introduction (continued)

1.1.3 References

References relating to the chapter content are identified at the end of each chapter. In addition to the specific subject matter references, the designer should have the following reference material available:

ADOT Hydrology Manual
ADOT Roadway Design Guidelines

A good hydraulics text, such as:
Chow, V.T. Open Channel Hydraulics, McGraw-Hill. 1970.
French, Richard H., "Open Channel Flow", McGraw-Hill, 1985
Henderson, F.M. Open Channel Flow, Macmillan. 1966

1.2 User Instruction

1.2.1 Instructions

This manual is for the design of drainage structures on ADOT projects. The methods described herein shall be used where appropriate for the design of drainage structures that are for ADOT projects or for drainage structures that will be within ADOT right-of-way. Where joint projects are to be developed through IGA's or JPA's there should be early discussions on the methods to be followed.

1.3 Questions and Comments

1.3.1 Content Questions

Any comments or questions should be addressed to the ADOT Roadway Engineering Group, Drainage Section. Questions about a particular computer program or application must be referred to the originating Agency or Company.

1.3.2 Errors, Additions And Updates

If errors are discovered in the ADOT Hydraulics Manual, they should be reported to the ADOT Drainage Section so that corrections can be made.